

From Cash to Clicks: UPI's Role in Shaping Digital Payments in India

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Abstract

India's financial environment has undergone a significant transformation, moving away from a cash-centric approach toward a digitally-oriented economy. Introduced in 2016 by the NPCI, the UPI has played a pivotal role in this evolution by facilitating instant, secure, and seamless bank-to-bank transfers through mobile platforms. As of May 2025, UPI facilitates over 14.5 billion monthly transactions valued above ₹20 lakh crore, accounting for more than 75% of all retail digital payments in India. This paper explores UPI's growth, functionality, and its expanding role in India's payment ecosystem through an analysis of trends from FY 2017–18 to FY 2023–24. Data shows exponential growth in UPI adoption, with a marked transition from Person-to-Person (P2P) to Person-to-Merchant (P2M) transactions, indicating rising commercial integration. Supported by innovations like UPI Autopay, UPI Lite, and credit card linkage, by enabling widespread access to seamless digital transactions, UPI has become instrumental in advancing financial inclusion and reinforcing the foundation of India's digital economy. While it faces challenges such as cybersecurity risks, server constraints, and digital illiteracy, its overall impact is undeniable. Drawing on RBI and NPCI data, this study highlights UPI's role in transforming India into a global fintech leader. The findings underscore UPI's importance in driving inclusive, scalable, and future-ready digital payment systems in both domestic and international contexts.

Keywords: Digital Payment, UPI, CBDC, Digital economy

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Introduction:

The financial landscape of India has undergone a radical transformation in the past decade, transitioning from a predominantly cash-based economy to one increasingly dominated by digital payments. Initiated in April 2016 by the NPCI, the UPI has come out as a central catalyst in this digital transformation through its real-time transaction framework. UPI enables instant, 24x7 inter-bank transactions via smartphones, making digital payments seamless, accessible, and highly interoperable. As of May 2025, UPI processes over 14.5 billion transactions monthly, with a total transaction value crossing ₹20 lakh crore. The platform accounts for more than 75% of all retail payment in the form of digital in India, far surpassing traditional systems like NEFT, RTGS, or card-based payments. UPI's popularity is further evidenced by its growing user base - supported by over 400 participating banks and third-party apps such as PhonePe, Google Pay, Paytm, Amazon Pay, and the government-backed BHIM app. This surge in adoption has been catalysed by factors such as the Digital India mission, growing smartphone penetration (expected to exceed 1.2 billion users by the end of 2025), increased internet accessibility, and the government's push toward a cash-lite

economy. UPI's zero-merchant discount rate (MDR) policy and simple QR-code based payments have also encouraged millions of small merchants and kirana stores to adopt digital methods.

Despite its notable progress, UPI continues to encounter several hurdles, such as cybersecurity vulnerabilities, inadequate digital infrastructure in rural areas, concerns over data protection, and limited digital literacy among segments of the population. However, its capacity to democratize access to financial services, foster financial inclusion, and align with future innovations like Central Bank Digital Currency (CBDC) and cross-border payment solutions underscores its pivotal role in India's digital economy. This paper examines the evolution, impact, and future trajectory of UPI, highlighting how it has redefined the digital payments landscape and propelled the nation's shift from “*cash to click*”.

Concept of UPI

UPI is an instant digital payment mechanism created by the NPCI and overseen by the RBI. Introduced in April 2016, it facilitates seamless, real-time fund transfers between bank accounts using mobile devices. UPI consolidates multiple banking functions into a single platform, permitting their users to send or receive money, settle bills, and make purchases online without requiring any bank account numbers—relying instead on a Virtual Payment Address or UPI ID. By promoting interoperability among banks and payment applications, UPI has completely changed India's digital payment ecosystem, making each transactions efficient and widely accessible across individuals, businesses, merchants, and public institutions.

How UPI Works

UPI is a real time digital payment platform that allowed users to transfer funds instantly between bank accounts using mobile applications. To use UPI, individuals must install a UPI-supported app like BHIM, Google Pay, PhonePe, or Paytm and link it to their bank account. After linking, users prepare a UPI ID, which required need not to share personal banking details such as account numbers or IFSC codes. Transactions are initiated by entering UPI ID of the recipient's or scanning a QR code, specifying the payment amount, and verifying the transaction with a secure 4- or 6-digit UPI PIN. The NPCI manages the system by securely directing the transaction between the involved banks, ensuring instant completion—even outside regular banking hours, including weekends and holidays. UPI supports a large range of functions, including person-to-person (P2P) and person-to-merchant (P2M) payments, utility bill settlements, recurring payments via UPI Autopay, and credit-based transactions through UPI Credit. Its integration with smartphones, emphasis on security, and ease of use have made UPI one of the most advanced and inclusive digital payment solutions globally.

Merits of UPI

The main advantages of the UPI ecosystem is its ability to facilitate instant, seamless, and interoperable transactions across banks and apps, replacing the requirement for traditional instruments like cash, cheques, or debit cards. UPI is also cost-effective—free for both users and merchants—which has encouraged widespread adoption, especially among small vendors and the informal sector. Its simplicity, enabled through QR code payments and mobile integration, has drastically reduced barriers to entry. Moreover, UPI has played a very important role in financial inclusion, bringing millions of people from rural and semi-

urban areas into the formal banking systems. It supports government initiatives like Direct Benefit Transfers (DBT), welfare schemes, and digital governance. The ecosystem also supports innovation through features like UPI Autopay, UPI Lite, UPI Credit, and cross-border transactions, making it scalable and adaptable to future needs.

Demerits of UPI

UPI ecosystem faces several challenges. Cybersecurity threats, such as phishing, fraudulent links, and impersonation scams, have increased with higher adoption. Frequent technical glitches—like transaction failures due to server downtime—affect user confidence. The zero Merchant Discount Rate (MDR) policy, while beneficial for users, has reduced the incentive for banks to invest further in UPI infrastructure since they do not earn transaction fees. Additionally, India's digital divide—reflected in limited smartphone access, poor internet connectivity in rural areas, and low digital literacy—remains a significant barrier to universal adoption. Data privacy concerns have also emerged, particularly with third-party apps, in the absence of robust data protection regulations. Moreover, the redressal mechanisms for fraud or transaction failures are often perceived as slow and ineffective, which can discourage users from relying on digital payments entirely.

Literature Review

Kumar et al. (2024) from IIT Bombay surveyed 2,000 urban and semi-urban users; 86% preferred UPI over cards or wallets, citing ease of use and peer recommendations.

Verma & Singh (2024), in a report by the Centre for Sustainable Finance, analysed UPI transactions across tier-2 to tier-5 towns, reporting 60% YoY growth in rural UPI volume and a 45% increase in QR-based acceptance among merchants.

Patil (2023) in *International Journal of Rural Management* noted how UPI simplified subsidy transfers to farmers under schemes like PM-KISAN, reducing cash leakage and improving timeliness.

Rajesh & Sharma (2023) in the *Journal of Financial Innovation* examined data from NPCI, finding a ~120% YoY growth in monthly active UPI users from 2021 to 2023, crediting its zero-fee model and convenience.

Mehta & Banerjee (2023) of ISB released a working paper on UPI Autopay, showing a 40% increase in recurring payments (subscriptions and bill payments) in the first year of rollout.

Fahad & Shahid (2022) applied diffusion of innovation theory, emphasizing initial trust and ease of use as primary determinants of UPI adoption.

Jha & Kumar (2021) explored consumer perceptions, identifying technology confidence and user-friendliness as key adoption drivers.

Nenavath Sreenu (2020) in *ACM Transactions* evaluated cashless policy effects, noting UPI's role in economic growth through increased transaction efficiency.

Sharma & Yadav (2017) surveyed 55 users and found 91% switched from cash to UPI, though challenges remained with transaction failures and infrastructure

Objective of the Study

- To analyse the progression of digital payment transactions in India over the last seven years.
- To examine the growth pattern and usage trends of UPI transactions across the same period.
- To offer insights and recommendations for policymakers, enterprises, and individuals aiming to support and enhance the expansion of digital payment infrastructure in India.

Research Methodology

This research employs a descriptive and analytical methodology to investigate the evolution and influence of digital payment systems in India, with particular emphasis on UPI during the period from 2017 to 2024. The study is based solely on secondary data sourced from credible institutions such as the RBI, the NPCI, and the respective banks. It focuses on analysing trends in transaction volumes, monetary values, and user adoption across various digital payment platforms, especially UPI. The aim is to uncover patterns of usage, assess UPI's contribution to reshaping India's digital financial landscape, and propose informed recommendations for policymakers, businesses, and other relevant stakeholders. The primary limitation of the study lies in its exclusive reliance on secondary data and the absence of field-based primary research.

Data Analysis & Interpretation

Table: 1 Digital Payment Transaction in India

Financial Year	No. of Transactions (in Crore)	YoY Growth (%)
2017–18	2,071	—
2018–19	3,134	51%
2019–20	4,572	46%
2020–21	5,554	21%
2021–22	8,839	59%
2022–23	13,462	52%
2023–24	18,737	39%

Source: RBI, NPCI & Banks



Figure 1: Number Of Digital Payment Transactions (in Crore) YoY Growth

Source: RBI, NPCI & Banks

Interpretation:

The evolution of UPI from FY 2017–18 to FY 2023–24 presents a compelling case study of how technology, policy, and consumer behaviour can converge to reshape a nation's financial infrastructure. The system started with 91.52 crore transactions in FY 2017–18 and soared to 13,116.47 crores by FY 2023–24—representing an astonishing over 140x increase in just seven years. The most dramatic leap occurred in FY 2018–19, with a 485% surge, largely driven by public acceptance of mobile apps, the simplicity of UPI's real-time bank-to-bank transfers, and aggressive promotion through the Digital India campaign. The expansion was further catalysed by UPI's zero-fee model, seamless interoperability between banks, and ease of access for even first-time internet users. In FY 2019–20 and FY 2020–21, although the YoY growth slightly declined to 134% and 78%, the platform gained more trust among users. The COVID-19 pandemic acted as a digital accelerator, prompting consumers and small merchants to shift to contactless transactions, which makes UPI as a common tool for both personal and business payments. This was also the period when UPI gained deep traction in semi-urban and rural areas, helped by the rollout of QR code infrastructure and increased smartphone penetration. From FY 2021–22 onward, UPI entered a maturity phase. Transaction volumes surged to over 4,500 crores in FY 2021–22 and continued to rise, hitting more than 13,000 crores in FY 2023–24. The YoY growth rates moderated to 106%, 82%, and 57%, respectively, which is natural for any system reaching scale. However, these numbers are impressive given the high base effect. Key innovations during this phase—like UPI Autopay for recurring billing, UPI Lite for offline micropayments, and integration with RuPay credit cards—strengthened its appeal across different use cases. Moreover, UPI's increasing role in merchant payments, P2M (person-to-merchant) transactions, and support for international remittance corridors (like the Singapore-India UPI linkage) show its growing global relevance. The declining growth rate in percentage terms is not indicative of weakness but of market stabilization and platform maturity. With over 400 million bank accounts linked to UPI and a transaction volume averaging more than 40 crores per day by FY 2023–24, UPI has transitioned from a novel digital tool to a vital national infrastructure. Its ability to support inclusion, reduce cash dependency, and provide

secure, efficient, and real-time payments has made India a global benchmark for low-cost, scalable fintech innovation.

Table: 2 Number of UPI Transactions (P2P & P2M)

Financial Year	P2P Transactions (in crore)	P2M Transactions (in crore)	Total Transactions (in crore)
2017–18	81.10	10.40	91.50
2018–19	422.20	113.10	535.30
2019–20	806.10	445.80	1,251.90
2020–21	1,303.90	929.20	2,233.10
2021–22	2,656.20	1,940.60	4,596.80
2022–23	4,115.00	4,260.10	8,375.10
2023–24	5,299.60	7,816.80	13,116.40

Source: RBI, NPCI & Banks

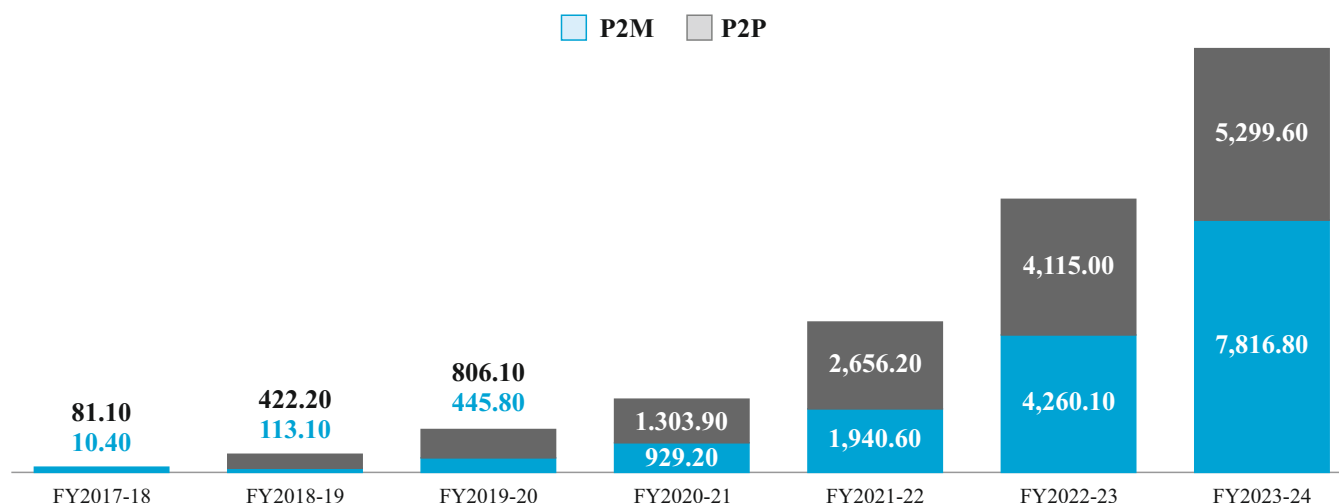


Figure 2: Number Of UPI Transactions (in Crore)

Source: RBI, NPCI & Banks

Interpretation:

The detailed breakdown of UPI transactions into Person-to-Person (P2P) and Person-to-Merchant (P2M) from FY 2017–18 to FY 2023–24 reveals the evolutionary maturity of India's digital payments ecosystem. In its initial years, UPI served primarily as a peer-to-peer fund transfer tool. In FY 2017–18, out of a total 91.50 crore UPI transactions, P2P accounted for 81.10 crore, while P2M contributed a mere 10.40 crore, reflecting the system's early reliance on interpersonal usage due to the lack of digital merchant infrastructure and user confidence in digital commerce. This pattern continued in FY 2018–19 and FY 2019–20, though P2M saw steady growth, increasing to 445.80 crore transactions by FY 2019–20 as smartphones, QR codes, and fintech apps became more accessible. The turning point emerged during FY 2020–21 and FY 2021–22.

While P2P transactions rose sharply to 2,656.20 crore in FY 2021–22, P2M transactions also grew rapidly, reaching 1,940.60 crore, fuelled by the pandemic-induced behavioural shift toward contactless payments. During this period, digital transactions were increasingly used for grocery purchases, utility bill payments, and essential services—areas traditionally dominated by cash. Initiatives such as zero MDR (Merchant Discount Rate) for small businesses, UPI QR code deployments under the Digital India framework, and onboarding of street vendors through schemes like PM SVANidhi created an enabling environment for P2M growth. A major structural shift occurred in FY 2022–23 when P2M transactions (4,260.10 crore) overtook P2P (4,115.00 crore) for the first time in UPI's history, signalling a broader transformation from a person-centric to a commerce-driven digital payment platform. This shift gained further momentum in FY 2023–24, when P2M transactions surged to 7,816.80 crores, now comprising nearly 60% of all UPI transactions. In contrast, P2P transactions reached 5,299.60 crore, showing stable but comparatively slower growth. The evolving trend suggests that UPI has expanded beyond personal convenience transfers to become the commonly used payment method across various sectors, including retail, utilities, services, and e-commerce. The growing prominence of person-to-merchant (P2M) transactions is the result of several interrelated developments: widespread uses of UPI by MSMEs and small retailers, the introduction of tools like UPI Autopay to facilitate recurring transactions and UPI Lite for offline micro-transactions, and the deployment of UPI Soundbox devices, which provide immediate transaction confirmations to merchants. Additionally, the integration of RuPay credit cards with UPI has transformed the platform into a comprehensive solution for both debit and credit transactions. This broadening of UPI's functionality has not only strengthened user trust but has also contributed to an increase in transaction volume and frequency.

Suggestion

To support the continued growth and development of digital payment systems in India, particularly UPI, several targeted suggestions can be made for policymakers, businesses, and individuals. Policymakers should prioritize strengthening cybersecurity infrastructure by implementing real-time fraud detection mechanisms and enhancing grievance redressal systems. Given the importance of inclusivity, they should also incentivize digital adoption among rural populations and small merchants through tax benefits, infrastructure subsidies, and extended UPI services like UPI123Pay for feature phones. Revisiting the current zero-MDR (Merchant Discount Rate) policy is essential to ensure the sustainability of banks and fintech firms that maintain the backbone of digital payments. Furthermore, nationwide digital literacy campaigns, especially in regional languages, are needed to build trust and ensure secure user behavior across demographics. For businesses and merchants, adopting QR-based UPI systems for daily transactions can streamline operations and reduce cash handling. Leveraging Autopay of UPI for recurring payments and UPI data analytics for customer insights can further enhance efficiency and engagement. Employee training on handling digital transactions should also be a regular practice. At the individual level, consumers are encouraged to embrace UPI for routine payments while practicing safe digital habits—such as avoiding suspicious links and protecting their PIN. Awareness and education among peers and community members can help widen the circle of digital trust and adoption.

Conclusion

The UPI has played a transformative role in shifting India's economy from cash to digital. Since its launch in 2016, UPI transactions have grown from 91.5 crore in FY 2017–18 to over 13,116 crore in FY 2023–24,

reflecting massive adoption across personal and commercial use. While early usage was dominated by Person-to-Person (P2P) payments, recent years have seen a sharp rise in Person-to-Merchant (P2M) transactions, which now constitute nearly 60% of total UPI volume—highlighting a fundamental behavioural shift in digital payment usage. UPI's success is driven by real-time, low-cost, and interoperable transactions, strengthened by innovations like UPI Autopay, UPI Lite, QR codes, and credit card integration. It has significantly advanced financial inclusion by enabling millions, including rural and small merchants, to access formal banking through mobile-based platforms. However, challenges remain in areas like cyber security, infrastructure scalability, and digital literacy. Overall, UPI has not only digitized payments but has democratized access to finance. As it expands globally and integrates with future systems like CBDCs, UPI stands as a symbol of India's fintech leadership—offering a scalable, inclusive, and sustainable model for digital payments.

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